

## CLAIMS

What is claimed is:

1    1. A communication system comprising:

2                 at least one base station for modulating a carrier signal in  
3 response to a data stream, which is to be transmitted by the base station, in  
4 order to produce a modulated carrier signal and transmit the modulated  
5 carrier signal through at least two distinct propagation media; and

6                 at least one mobile station in communication with the base  
7 station for receiving the modulate carrier signal, which undergoes distortion  
8 due to propagation through a medium, as a distorted carrier signal through the  
9 at least two media and demodulating the distorted signal to recover the data  
10 stream,

11                 wherein distinct pilot signals, known by the mobile station, are  
12 transmitted to the mobile station by the base station through each of the  
13 propagation media, and the mobile station receives the pilot signals as  
14 distorted pilot signals through each of the propagation media, then compares  
15 the received distorted pilot signals to determine and predict propagation  
16 measurements, and wherein feedback information, which is determined  
17 therefrom, is transmitted from the mobile station to the base station, then  
18 utilized by the base station to alter the characteristics of the modulated carrier  
19 signal prior to transmission.

1    2. The system of claim 1, wherein the base station further comprises:

2                 at least two antennas coupled to the respective media;

3                 a transmission unit coupled to the respective antennas, wherein the  
4 transmission unit receives the data stream and modulates the carrier signal to  
5 produce the modulated carrier signal; and

6                 a calculation unit coupled to the transmission unit and the at least two  
7 antennas for receiving the feedback information from the mobile station, and

9 modulated carrier signals being transmitted over each of the media are  
10 weighted.

1 3. The system of claim 2, wherein the base station transmits a distinct  
2 pilot signal to the mobile station via each of the at least two antennas.

1 4. The system of claim 3, wherein the predicted feedback information is  
2 transmitted from the mobile station to the base station via a feedback channel.

1 5. A method for providing feedback from a mobile station to a base station  
2 base on predicted information, the method comprising:

3 performing propagation measurements for a plurality of  
4 propagation media;

5 estimating a representative value for each of the at least two  
6 propagation media based on the propagation measurements;

7 performing prediction of future propagation measurements for  
8 each of the plurality of propagation media; and

9 generating the feedback information based on prediction of  
10 future propagation measurements.

1 6. The method of claim 5, further comprising conveying the feedback  
2 information to the base station using a feedback channel.